

CARBON ISOTOPE TIME SERIES OF CORALLINE SPONGES FROM THE CORAL SEA, PHILIPPINES AND CARIBBEAN. *Memoirs of the Queensland Museum* 44: 84. 1999:- Live coralline sponges (*Ceratoporella nicholsoni*, *Astrosclera willeyana*, *Spirastrella* (*Acanthochaetetes*) *wellsi*) were collected from reef caves and deeper reef slopes of the Caribbean, the Visaya Sea (Philippines) and the Coral Sea (Great Barrier Reef). The specimens were dated by either radiocarbon or uranium-thorium methods. Age ranges were from 200-600 years. We tested the reproducibility of $\delta^{13}\text{C}$ values measured on the aragonite of *Ceratoporella nicholsoni* by investigating variations along single layers of a well-laminated specimen. We also compared values measured on the outermost layers of several specimens. The reproducibility for $\delta^{13}\text{C}$ is excellent in most cases. Only few samples show depletion by up to 0.2 permil. Two parallel transects through a specimen of *Astrosclera willeyana* also display excellent reproducibility of $\delta^{13}\text{C}$ values. All specimens show the well-known industrial decline in $\delta^{13}\text{C}$ values starting ca. in 1850 A.D (e.g. Druffel & Benavides, 1986; Böhm et al., 1996). In comparing the magnitude of this decline measured in our samples and in $\delta^{13}\text{C}$ of atmospheric CO_2 we can estimate the local degree of isotopic equilibration between atmosphere and sea-water. We find values range from 40% of the atmospheric change at the Great Barrier Reef and in the Philippines to 65% in Jamaica. For each site we compared the preindustrial $\delta^{13}\text{C}$ from total CO_2 (DIC) of the surface water, calculated from our sponge records, with published phosphate concentrations. The

values agree with a high input of nutrient-rich subsurface water at the Philippine site and at the Great Barrier Reef. At the Great Barrier Reef local upwelling at the reef front has been reported. However, the measured $\delta^{13}\text{C}$ values are much lower than expected for average phosphate concentrations. Either the upwelling is much more intense than assumed, or the *Astrosclera* record is affected by secondary processes and/or a vital/kinetic effect. □ *Porifera, coralline sponges, Philippines, Great Barrier Reef, Caribbean.*

Literature cited.

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